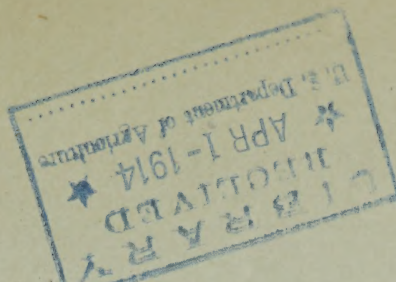


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# United States Department of Agriculture,

## BUREAU OF PLANT INDUSTRY,

### Forage-Crop Investigations.

WASHINGTON, D. C.

#### SWEET CLOVER (*Melilotus alba*).

The sweet clover which is common throughout the United States, growing freely on the roadsides and in waste places, was introduced from the Mediterranean region of Europe. It is occasionally called melilot and also Bokhara clover. The biennial yellow-flowered melilotus (*Melilotus officinalis*) and, in the South and Southwest, *Melilotus indica*, a small annual yellow-flowered melilot, are also called sweet clover, but the white-flowered species is more common and better adapted to cultivation, owing to its more erect growth and greater vigor.

*Melilotus alba* is a biennial leguminous plant, growing to a height of 3 to 8 feet and branching freely when the stand is not too thick. It resembles alfalfa when young, but can be distinguished then by its bitter taste, and later when in bloom by the long, loose racemes of white flowers in contrast to the close purple clusters of alfalfa flowers. The root system of sweet clover is one of its most notable features. In a young plant during the first season of growth, the root develops to a large size, striking deep into the soil and becoming quite fleshy, oftentimes reaching a diameter of one-half inch at the crown of the plant. It has a central taproot which, however, branches much more freely than that of alfalfa. This fleshy character of the root means the addition of a great amount of vegetable matter to the soil, even when the top of the plant is removed as a hay crop.

*Uses.*—Sweet clover was used as a food for animals at least 2,000 years ago. The most prominent use at present is probably that of a soil improver. In this rôle there appears to be no other plant which so quickly puts waste land or run-down farms back into condition for producing crops. The value of sweet clover for this purpose is recognized in Alabama and Mississippi, and also in parts of Kentucky. In other sections of the country it has been used in a small way as a green-manure crop, the second year's growth being plowed under. By this method extremely large quantities of vegetable matter are returned to the soil. The root system alone has been estimated as about 20 tons green weight per acre in a good growth of sweet clover. The decay of the fleshy roots at the end of the second year, when the plant itself dies out, opens up the soil and provides a passage for the water and air into the subsoil.

It is better adapted than alfalfa to short rotations on account of its biennial nature. Seeded in the spring of the year, either alone or with a nurse crop, it produces its largest growth the following season and is ready either to turn under for green manure or to be utilized as a hay crop. This feature allows it to be used in short rotations with corn or small grain. In a great many soils where alfalfa does not thrive, sweet clover has proved to be an excellent substitute. In other soils, as in the sandy soils of northern Nebraska, the use of sweet clover on the land previous to seeding alfalfa gives the inoculation so badly needed for the success of alfalfa and also improves the physical properties of the soil. Its use in other localities as a forerunner crop for alfalfa is strongly advised.

The value of sweet clover as a hay crop is a question of very much dispute. In localities where it has been grown for some time the producers assert that



all kinds of stock eat it readily after they have once become accustomed to the taste. In food principles it is practically equal to alfalfa, and feeding experiments with sheep at the Wyoming experiment station have fully demonstrated its value for this class of live stock.

At the present time the seed of sweet clover commands a higher price on the market than that of alfalfa or red clover. The production of seed, when properly handled, is heavy, hence the profits per acre from a seed crop are considerable.

As a bee pasture it ranks among the best, and even before its possibilities in other lines of agriculture were recognized it was extensively used by honey producers as a pasture for bees.

*Soil requirements.*—Sweet clover has ability to thrive on poor clay soils as well as on poor sandy soils, but it prefers soils of limestone origin; if seeded on clay soils that are inclined to be sour, considerable lime should be added at the time of seeding. In the limestone soils of Alabama, Mississippi, and parts of Kentucky it grows freely and is quite widely used, while on the adjoining pure clay soils little of it is to be found. Sweet clover is also very resistant to alkali and plants may be found in the West growing on soil where little else than salt grass otherwise occurs.

*Inoculation.*—On the poorer soils, in localities where sweet clover is not common, it is quite important that the soil be inoculated at seeding time to insure good results; and even in localities where sweet clover is plentiful the early growth has been made much more vigorous by thoroughly inoculating the soil. Inoculation can be accomplished by scattering 300 to 500 pounds per acre of the soil from an old sweet-clover patch over the field, either by hand or in a fertilizer drill. Inoculation is accomplished in the South by the use of seed in the hull, which seed has been gathered from the ground and has some soil adhering to it. Inoculating material in liquid form for the treatment of the seed is also furnished by the United States Department of Agriculture.

*Seeding.*—The time for sowing sweet clover differs widely in different sections of the United States. In the eastern part, in the latitude of Washington, D. C., a good stand can be obtained by seeding either in early spring or about August 15. One disadvantage attendant upon early fall seeding is that the plant matures and dies the following year and only a small growth is obtained. Seeding in midwinter is also promising, as the seed germinates better after freezing. If seeded in the spring, the sweet-clover plant makes one cutting the first year without maturing seed and will produce at least one cutting of hay the following year in addition to a crop of seed, so that in all localities where it is possible to obtain a stand by spring seeding it is advisable to sow at that season. In the Southern States, as far north as the Ohio River, the practice is to seed quite early in the spring, during February or the early part of March. In the States farther north this date is correspondingly later, until in Wisconsin it is usually seeded in the latter part of April or first of May. If a cutting of hay is desired the first year, it is best to seed the sweet clover alone. Where the rainfall is sufficient, a stand can be obtained by seeding in small grain, either fall wheat or spring-sown crops like oats and barley; but in seeding with grain one runs the risk of having the sweet-clover plants killed out by drought during the summer. Owing to the rather slow germination of the seed it is usually best to seed at the rate of about 20 to 25 pounds per acre, since one can better afford to waste the extra amount of seed than to lose the use of his ground for a season owing to a poor stand. The slow germination of sweet-clover seed is largely due to the presence of a considerable quantity of hard seed. It has been found lately that by treating the seed with concentrated sulphuric acid a large percentage of the hard seed present can be made to grow promptly. The germination of different lots of seed was increased from 40 and 50 per cent up to 95 and 97 per cent by soaking the seed from 15 to 30 minutes in concentrated commercial sulphuric acid and then washing it quickly and thoroughly in water. This method, investigated first by Prof. Bolley, of the North Dakota experiment station, and later developed by the New York experiment station at Ithaca, is not well adapted for general use by the farmers, owing to the liability of burning the hands by contact with the sulphuric acid as well as to the danger to children of having the acid on the premises. It is hoped, however, that it can be made practicable for seed dealers, so that the seed can be delivered to the farmer already treated.

In semiarid sections the seed should be sown very early in the spring or as soon as there is enough moisture in the ground. At least a part of the seeding



should be made in rows 42 inches apart so that they can be cultivated the same as corn. This insures a much better growth in droughty seasons.

*Harvesting.*—When hay is desired, the sweet clover should be cut before it begins to bloom; at this time the stems are succulent and the leaves most abundant. One difficulty in utilizing sweet clover for hay is the fact that it is very hard to cure successfully. The leaves cure rapidly in the sun, but the large succulent stems remain juicy for some time, so that generally by the time it is safe to store the hay a large percentage of the leaves have been lost. It is usually possible with the spring-sown sweet clover to harvest one cutting of the hay the first year and the following season obtain one cutting of hay and a crop of seed, or two cuttings of hay if the seed is not desired.

In harvesting the seed it is important that the plants be cut before the seed has fully matured. One must watch the seed crop carefully, and as soon as the lower racemes are dry and mature it is best to cut the crop. Even where it is mown and the seed flailed out, probably not more than three-fourths of the racemes should be allowed to fully mature. Most of the seed handled by the northern growers at the present time is handled as hulled seed, while in the South it is generally utilized unhulled. Sweet-clover seed can be thrashed easily by an ordinary thrashing machine, but if it is to be hulled a regular clover huller must be used. In semiarid and irrigated sections the hulls are dry enough so that an ordinary grain thrasher will remove most of them.

*Eradication.*—The failure of the farmers throughout the United States to make use of this valuable legume has largely been on account of the fear that it could not be eradicated from their farms if once started. The biennial nature of the plant makes the problem of eradication a very easy one. It will not persist when continuously mown so that it can not produce seed, nor is it troublesome in clean, cultivated or intertilled crops. Its appearance in a grain or alfalfa field, therefore, is no reason for alarm. The frequent cuttings of alfalfa will within a few years entirely destroy the sweet clover, and in grain or corn fields the ordinary cultivation accorded such fields will keep the sweet clover from being troublesome. Many people have classed the sweet clover as a perennial because it appears annually along the roadsides and in deserted fields. Its appearance, however, is due to the fact that it reseeds itself and not that it presents a new growth each year from the old root.

Considering the above points of advantage possessed by this sweet clover, a more widely extended use of it in the improvement of worn-out lands and preparation of ground for alfalfa through inoculation and soil improvement will prove of value. The use of sweet clover as a hay and pasture crop in localities where alfalfa or other leguminous forage plants do not succeed is recommended.

J. M. WESTGATE,  
*Agronomist in Charge of Clover Investigations.*

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